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UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service

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CONSERVATION WEEK

Conservation means wise use of our natural resources. That our use has not always been well planned is evidenced on many sides. The great floods in the Ohio and Mississippi Basin are a recurring reminder of man's mistakes. And this latest flood brings tragically to our attention the importance of a coordinated effort to solve the problem.

Conservation Means Wisely Regulated Use

Conservation has come to mean the wisely regulated use of our natural resources to insure "the greatest good to the greatest number for the longest time."

Save Water and Save All

Our greatest natural resources in California are our water, soil, forests, wildlife, minerals, and petroleum products. Water heads the list, for in this semi-arid country there is an eight or nine months season with practically no rainfall. To hold the rainfall successfully for use during the dry months is the ultimate aim of many conservation practices. If rainfall on cultivated land is prevented from running off, topsoil will not be carried away. Erosion control plans provide for the holding of water insofar as possible, slowing down the flow of surplus water and thus minimizing the loss of soil. Wind erosion is not of marked importance in California.

Maintain Forests

Forested areas are conserved so that through the maintenance of an adequate forest cover runoff will be slowed down, soil will be protected from washing, and streams will continue to flow clear water long after the rainy season is over.

Man has erected storage dams to hold back winter rain and melted snow to provide water for irrigation and domestic use during the dry periods. Adequate forest cover prevents the silting of these dams and the lowering of their storage capacity. Forest cover is an all-inclusive term, meaning not only trees, but shrubs, grasses, litter, and all types of vegetative material.

Prevent Fires

The destruction of forest cover by fire, unwise timbering operations and overgrazing, tend to defeat conservation.

Unwise use of our natural forested areas has removed breeding and nesting places of wildlife; it has also destroyed natural food plants and natural watering places.

Protect Wildlife

Water is again of prime importance in limiting the bird and wildlife population. There is a limit in the radius birds and animals will feed away from water. This means overfeeding in areas near live springs or streams when others nearby dry up.

In cultivated areas the development of watering places and the planting and encouragement of shrubs and grasses that have value as food and shelter will help restore wildlife population.

Keep Streams Clear

Adequate forest cover provides clear water in streams throughout the year, thus permitting maintenance of conditions helpful to a continuing supply of fish.

Help People To Become Conservation-Minded

Automobiles have enabled the masses of our population to visit our forested areas. The creation and wise management of recreational opportunities, through the establishment and operation of national, state, and county parks, and state and national forests, shows them the benefits of conservation. To make people conservation-conscious or conservation-minded is important because all conservation activities are supported, in the main, from public funds. However, on privately-owned lands the conservation of the soil and the prevention of erosion is demonstrated through cooperative agreements between the farmers and the Government.

Other Conservation Agencies

Conservation Week affords us an opportunity to acquaint the public with ideas on soil conservation. But it also brings to our attention the activities of other governmental agencies engaged in important conservation work. We can evaluate and appreciate the work of others in the long-time coordinated conservation program.

Education

Conservation can not go far without education. The next and succeeding generations will do far more toward conserving our natural resources than has been done. Children in the elementary grades, as well as in high schools are being taught the value of conservation. The subject will soon be a part of the course of study in most high schools in the country.

Many organizations, and special groups of public-spirited men and women, have active conservation committees that receive a real stimulus each year due to the publicity given Conservation Week.

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BURBANK, THE WORKER

Arbor Day

Luther Burbank, the plant breeder, is revered by all who knew him and his work. His birthday, March 7, has been officially made Arbor Day in California. This date also marks the commencement of Conservation Week in California.

Industrious

Burbank was industrious and recognized the value of time. While always courteous, he disliked interruptions and had little time for the casual visitor. He often said that he had so much work to do that he would never live long enough to do it.

Burbank Disliked Making Addresses

On one occasion he was invited by some college students to make an address before a group at the University of California in Berkeley. He did not wish to accept and wrote a letter that he felt sure would end the matter. He said his charge would be $100.00 and he knew his talk was not worth any part of that sum. The college students were not dismayed; they assumed the obligation and arranged for the lecture in one of the University's large assembly rooms. The lecture was well advertised and 500 gained admittance with as many more turned away at the door. Mr. Burbank began his talk with the statement that the young men who had prevailed upon him to appear before the audience should be spanked. He had so much work to do at home that he should never have accepted, but as he was before them he would show some colored lantern slides. His voice was weak and did not carry beyond the sixth row of seats. This was in the days before the public address systems. His slides were unusually fine for that period and he entertained his audience for an hour. But the next morning he was at his home and again at work.

CONSERVATION APPRECIATED

Frost Protection Costly

Conservation of citrus trees and citrus crops has been demonstrated to all who live in the vicinity of the citrus plantings. During the month of January the cost of conservation over a 20-day cold period exceeded six million dollars. Most citrus growers had provided their groves with heaters at an expense varying from $200.00 to $500.00 an acre. Growers estimate that with all the equipment in operation it cost $4.00 per acre per hour to operate.

These citrus growers also practice soil conservation. Their land and crops are valuable. They recognize it. They set a wonderful example to other farmers in the matter of conservation.

Soil is Irreplaceable

Soil is valuable. It is more valuable than the trees or crops, for the trees can be planted and grown again, if necessary, but the cost of preventing soil washing is only a small fraction of the investment necessary to prevent the damage from frost.

Change in Cropping System

Conservation of soil often necessitates a change in the cropping system. Shall this change be accepted at much less cost than the citrus growers assumed or will the present system be continued until such time as there is not sufficient topsoil to warrant farming the land? There should be but one answer and there should be no hesitancy.

CHILDREN ARE TAUGHT

Early Training In Conservation

Children's minds are keen. They grasp information presented to them in an understanding way. They think and discuss at home new ideas that are taught them at school. Their powers of observation are developed by relating ideas to every day problems with which they are familiar. These children will, before many years, be carrying forward the affairs of the nation.

With a realization that education along the lines of Soil Conservation can not be started too early in the lives of children, articles have been prepared for use in all grades of the schools and are being distributed for use during Conservation Week.

FLOODS AND CONSERVATION

Ohio Drainage Compared to California

Most of us who have travelled from one end of California to the other, and across the state, appreciate its size. There are almost 100 million acres in this state. Many rivers in the coastal area drain directly into the ocean. Those from the Sierras, with few minor exceptions, drain through the San Joaquin and Sacramento Rivers and are concentrated at Carquinez Straits from whence the tidal flow takes these waters through the Golden Gate to the Ocean. The drainage basin of these great rivers is approximately 30 million acres - less than one-fourth of the drainage basin of the Ohio River - which is estimated at 127 million acres. Melting snows accompanied by warm rains below the 5000 feet elevation in the northern part of the state, frequently bring the Sacramento River to flood stage. The flood stage at Sacramento is 28 feet. The depth of water at Cairo, where the Ohio enters the Mississippi, is nearly 60 feet. The Sacramento River at high water mark is a considerable stream, but the Ohio, with six times as large a drainage basin, and a wall of water 2½ times as high and many times wider, is a flowing inland "ocean."

Reduce Effects of Floods

Floods along the Ohio and Sacramento Rivers occurred long before the white man started to cut timber and break the natural sod with a plow. Climatic conditions are such that floods may be expected in the future. It is believed that by widespread application and combination of proper land management, and of upstream and downstream engineering work, the strength and height of floods can be reduced.

Soil Conservation May Help

Experimental work has shown that through soil conservation practices, a larger percentage of the rainfall will remain where it falls and not start rushing toward the sea with a heavy load of soil. There are many types of vegetation composed of trees, shrubs, herbs, and grasses, that hold a much larger percentage of the rain that falls than bare land that has been overgrazed or clean-cultivated. Contour tillage and terracing on cultivated lands reduce run-off.

On our California demonstration projects,

where several adjoining watersheds are included, ample evidence of the effectiveness of our work has been shown where control measures have been completed on one watershed and the other only started. The difference in the amount of run-off has been very marked. Also, the difference in the quantity of soil carried by the streams from the two watersheds has been striking.

Denuded Forests Increase Flood Hazards

The value of protective forest cover in preventing floods was demonstrated in 1933 in southern California. Pickens and San Dimas Mountain Canyons open into a fertile valley. Fire removed the forest cover on 5000 acres in Pickens Canyon in 1933, but fire did not visit San Dimas Canyon. Late in December,1933, a heavy storm hit both canyons alike. On New Year's day, 1934, a flood swept out of Pickens Canyon, destroyed 200 homes and killed 34 persons. There was no flood from unburned San Dimas Canyon. In 1935 fire swept out of Frankish Canyon through Upland. The same storm struck the unburned San Dimas Canyon but did not precipitate a flood there.

Fire protection for forested watersheds is a most important conservation measure. Floods may be expected from time to time but the practice of all known conservation measures will minimize the effects and lessen the damage.

CCC FIGHT FOREST FIRES

Many of the CCC enrollees,assigned to Soil Conservation Camps,engaged in fighting forest fires this past season. By so doing they were doing effective conservation.

Effective Conservation

The Forest Service welcomed an organized group hardened to hard work and with available transportation. The elapsed time between the breaking out of a fire and the arrival of men ready to work has a great influence on effectively controlling fires.

Matilija Canyon Fire - 1932

One of the most spectacular fires of recent years was the Matilija Canyon fire of September, 1932, on the Santa Barbara National Forest. This fire spread over an area 32 miles long and 8 miles wide, covering some 220,000 acres. This was

before the organization of CCC Camps and before this fire was controlled 2500 men were engaged in fighting it. It was necessary to dig 302 miles of fire lines. The loss of deer and quail was very heavy. The destruction of the forest cover seriously damaged the water supply of the nearby coastal cities. The reservoir silting that resulted from run-off from these burned areas proved very costly.

TOURS OF DEMONSTRATION PROJECTS

Demonstration Projects

Today the nation is engaged in an earnest fight against loss of natural resources. Nature is bountiful but it cannot withstand ruthless exploitation. A realization of that fact has led to a nation-wide campaign to conserve our resources, including the fundamental resource - the soil.

As part of the program to conserve the soil there has been established in California a number of demonstration projects to serve as guides to the farmers of the state in curbing soil erosion. Projects are located in the following counties: El Dorado, Sonoma, Solano, Santa Cruz, Orange, San Diego, Los Angeles, Ventura, Santa Barbara, and San Luis Obispo. Assisting the Service in this work are nine Civilian Conservation Corps Camps.

Tours

These project areas range from a few thousand acres up to 40,000. In them, methods to keep the soil from washing away are being instituted in cooperation with farmers within the areas. Tours of these projects have been made and are being made in cooperation with the state Agricultural Extension Service. As a result of these tours erosion control methods are gradually being made known to an increasing number of farmers.

During California Conservation Week, March 7-14, tours of the various projects have been planned. The general public, as well as farmers, is invited to attend these tours. Those wishing to go on a tour during Conservation Week should get in touch with their county farm advisor. Watch your newspaper for announcement of tours.

TERRACE OUTLETS

- by -
Donald C. Johnson, Regional Engineering Staff

The terrace outlet, though usually in itself an unimportant appearing structure, is entitled to be classified as one of the most important structures with which we have to deal.

Terrace Outlets

Usage of the term "terrace outlet" has grown to include structures which serve as outlets not only for the terrace type of drainage channel but for many other types of drainage channels, the function of which is to receive the surface run-off as the primary collecting tributary of a system of controlled run-off drainage. Examples of drainage channels which depend on "terrace outlet" control structures are contour ditches, annual ditches, broad- and narrow-base terraces, intercepting drains for furrow irrigation,etc. Intercepting drainage channels for systems of the above primary channels also call for control structures which fall into the general classification of terrace outlets.

The function of the structure is not as simple as the name implies, and includes the following important features:

Fixes Elevation of Terrace Grade

1. It fixes the elevation of the lower end of the drainage channel, which means that the flow line of the terrace or ditch will gradually adjust itself either by silting in or cutting, until its stabilized slope is established, which is fixed by the crest of the outlet structure at the lower end.

Terraces are constructed on a grade which is the estimated probable stable grade for the type of soil in which they are constructed. In order to insure that the terraces will not be cut, or fill with silt excessively, the outlet must be placed accurately at the elevation which will conform with the anticipated stabilized grade.

Fixes Location of Terrace in Field

2. It fixes the location in the field, of the outlet end of the terrace, and serves as a definite point for the farmer to work to in maintaining the terrace or ditch. Given this starting point and the location of the ditch as shown by the original

construction, the ditch may be maintained permanently by proper cultivation and using care not to level off the raised portion or to fill in the lower portion of the ditch section.

Serves as Inlet and Outlet

3. It serves not only as an outlet to the terrace or ditch, but also as an inlet to whatever type of drainage channel is used to lead the water safely away from the controlled area. In this capacity it must adequately provide a means of entering the drainage channel safely without causing the flow to be disturbed sufficiently to cause damage; it must also be designed to prevent local scouring at the entrance to the outlet, and in cases of free overfall it must be designed to prevent erosion of the sides or bottom of the channel below. In reality, then, in addition to its effect on the terraces it controls, it performs three important functions in itself; as an inlet entrance from the ditch to the structure itself, as an outlet for the flow from the ditch, and as an inlet to the conduit it flows into,

Conditions Under Which Outlets Operate

Some of the conditions that terrace outlet structures are designed for are listed below:

1. Flow from terrace into lined ditch at approximately same grade.

2. Flow from terrace into lined ditch at a considerable difference in elevation, where a drop is used before the flow enters the ditch.

3. Flow from terrace into a deep gully, where an overhanging pipe is used with a free overfall into the gully.

4. Flow from terrace into a pipe conduit, through a pipe riser which acts as the terrace outlet and pipe inlet.

5. Flow from terrace or collecting intercepting ditch into a deep gully where a pipe chute is used to the bottom of the gully and an energy dissipating outlet is employed - usually a baffle-type structure.

Inspection Required as Maintenance Feature

Although most terrace outlet structures are of permanent construction, they should be watched carefully by the farmer to see that they are not clogged by weeds or debris. Of equal importance is the ne-

cessity of maintaining the terraces free of gopher holes or obstructions.

First Structure Required in Up-Stream Engineering

Of some significance is the fact that terrace outlet structures represent the first point in most control work where the structural designer is needed. The majority of these structures are built of reinforced concrete or rubble masonry. The design for strength is usually unimportant as compared with the hydraulic features and location relative to adjoining construction or drainage channels.

Economic Design Essential

Economic design is highly important here, considering the vast number of these structures used. More terrace outlet structures are used than any other type required, for regardless of the type of construction used, some form of outlet control is necessary for every terrace, contour ditch, or other form of earth drainage channel.

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FARM WOODLANDS

What can you do to take better care of your farm woodlands? The first thing is to be sure that the part of your farm reserved for woodland is sufficient to take care of your needs, and in turn, that your needs are sufficient to justify your giving the woodland careful attention.

Fire

Protecting your woodland from fire is of primary importance. Give the young trees a chance to reach maturity so that you will have a constant source of usable or salable material.

Grazing

Avoid grazing your woodlands. Such areas can seldom be considered as good grazing land, and grazed woodland is never as productive as ungrazed. By keeping the stock out you have better trees.

Harvesting

Use care in harvesting your crop. When you want to cut trees for fuel, posts, or any other purpose, try to select and remove them in such a manner that you will not destroy the young growth.